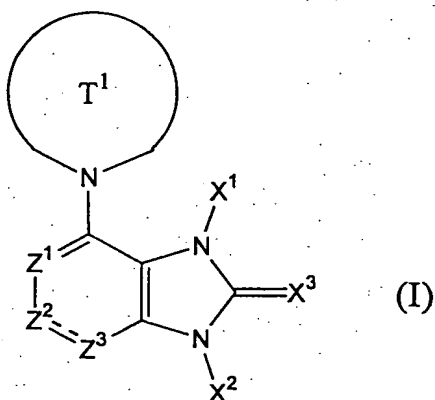


## CLAIMS

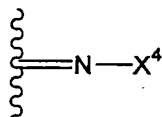
1. A compound represented by the general formula (I), or a salt or a hydrate thereof,



5 [wherein,

T<sup>1</sup> stands for a monocyclic or bicyclic 4 to 12-membered heterocycle containing 1 or 2 nitrogen atoms in the ring, which may have substituents;

X<sup>3</sup> denotes an oxygen atom, sulfur atom, or a group of the formula



10

X<sup>4</sup> denotes a hydrogen atom, a C<sub>1-6</sub> alkyl group which may have substituents, a C<sub>3-8</sub> cycloalkyl group which may have substituents, or a C<sub>6-10</sub> aryl C<sub>1-6</sub> alkyl group which may have substituents;

15 X<sup>1</sup> denotes a C<sub>1-6</sub> alkyl group which may have substituents, a C<sub>2-6</sub> alkenyl group which may have substituents, a C<sub>2-6</sub> alkynyl group which may have substituents, a C<sub>6-10</sub> aryl group which may have substituents, a 5 to 10-membered heteroaryl group which may have substituents, a C<sub>6-10</sub> aryl C<sub>1-6</sub> alkyl group which may have substituents, or a 5 to 10-membered heteroaryl C<sub>1-6</sub> alkyl group which may have substituents;

20

Z<sup>1</sup> denotes a nitrogen atom, or a group of the formula -CR<sup>3</sup>=;

Z<sup>2</sup> and Z<sup>3</sup> each independently denote a nitrogen atom, a group of the formula -CR<sup>1</sup>=, a carbonyl group, or a group of the formula -NR<sup>2</sup>-;

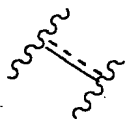
25

in formula (I), the following formula



denotes a double bond or a single bond;

in formula (I), when the following formula



denotes a double bond,  $Z^2$  and  $Z^3$  each independently denote a nitrogen atom or a group of the formula  $-CR^1=$ ;

$R^1$ ,  $R^2$ ,  $R^3$ , and  $X^2$  each independently denote a hydrogen atom, a 4 to 8-membered heterocyclic group which may have substituents, or a group represented by the formula  $-A^0-A^1-A^2$ ;

$A^0$  denotes a single bond, or a  $C_{1-6}$  alkylene group that may have 1 to 3 substituents selected from the following substituent group A;

$A^1$  denotes a single bond, oxygen atom, sulfur atom, a sulfinyl group, a sulfonyl group, a carbonyl group, a group of the formula  $-O-CO-$ , a group of the formula  $-CO-O-$ , a group of the formula  $-NR^A-$ , a group of the formula  $-CO-NR^A-$ , a group of the formula  $NR^A-CO-$ , a group of the formula  $-SO_2-NR^A-$ , or a group of the formula  $-NR^A-SO_2-$ ;

$A^2$  and  $R^A$  each independently denote a hydrogen atom, a cyano group, a  $C_{1-6}$  alkyl group, a  $C_{3-8}$  cycloalkyl group, a  $C_{2-6}$  alkenyl group, a  $C_{2-6}$  alkynyl group, a  $C_{6-10}$  aryl group, a 5 to 10-membered heteroaryl group, a 4 to 8-membered heterocyclic group, or a  $C_{6-10}$  aryl  $C_{1-6}$  alkyl group;

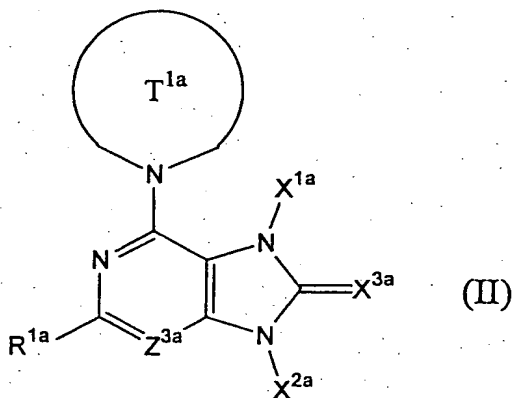
however,  $A^2$  and  $R^A$  each independently may have 1 to 3 substituents selected from the substituent group A described below:

#### <Substituent group A>

substituent group A refers to a group consisting of: a hydroxyl group, a mercapto group, a cyano group, a halogen atom, a  $C_{1-6}$  alkyl group, a  $C_{3-8}$  cycloalkyl group, a  $C_{2-6}$  alkenyl group, a  $C_{2-6}$  alkynyl group, a  $C_{6-10}$  aryl group, a 5 to 10-membered heteroaryl group, a 4 to 8-membered heterocyclic group, a  $C_{1-6}$  alkoxy group, a  $C_{1-6}$  alkylthio group, a group of the formula  $-NR^{B4}-R^{B5}$  (where  $R^{B4}$  and  $R^{B5}$  denote hydrogen atoms or  $C_{1-6}$  alkyl groups), a group of the formula  $-CO-R^{B6}$  (where  $R^{B6}$  denotes a 1-pyrrolidinyl group, a 1-morpholinyl group, a 1-piperazinyl group, or a 1-piperidyl group), and a group of the formula  $-CO-R^B-R^{B2}$  (where  $R^B$  denotes a single bond, an oxygen atom, or a group

represented by the formula  $-NR^{B3}$ ;  $R^{B2}$  and  $R^{B3}$  each independently denote a hydrogen atom, a  $C_{1-6}$  alkyl group, a  $C_{3-8}$  cycloalkyl group, a  $C_{2-6}$  alkenyl group, a  $C_{2-6}$  alkynyl group, a  $C_{6-10}$  aryl group, a 5 to 10-membered heteroaryl group, a  $C_{6-10}$  aryl  $C_{1-6}$  alkyl group, or a 5 to 10-membered heteroaryl  $C_{1-6}$  alkyl group)].

2. A compound represented by the general formula (II), or a salt or a hydrate thereof,



[wherein,

$Z^{3a}$  denotes a nitrogen atom or a group of the formula  $-CR^{2a}=$ ;

$X^{3a}$  denotes an oxygen atom or a sulfur atom;

$T^{1a}$  stands for a monocyclic 4 to 8-membered heterocycle containing 1 or 2 nitrogen atoms in the ring, which may have an amino group or a  $C_{1-6}$  alkylamino group;

$X^{1a}$  denotes a hydrogen atom, a  $C_{2-6}$  alkenyl group, a  $C_{2-6}$  alkynyl group, or a benzyl group;

$R^{1a}$  and  $R^{2a}$  each independently denote a hydrogen atom, a halogen atom, a  $C_{1-6}$  alkyl group, a cyano group, or a group represented by the formula  $-A^{0a}-A^{1a}$ ;

$A^{0a}$  denotes an oxygen atom, a sulfur atom, or a group represented by the formula  $-NA^{2a}$ ;

$A^{1a}$  denotes a hydrogen atom, a  $C_{1-6}$  alkyl group, a  $C_{2-6}$  alkenyl group, a  $C_{2-6}$  alkynyl group, a phenyl group, a cyanophenyl group, a carbamoylphenyl group, a benzyl group, a pyridylmethyl group, or a pyridyl group;

$A^{2a}$  denotes a hydrogen atom, or a  $C_{1-6}$  alkyl group;

$X^{2a}$  denotes a hydrogen atom, a  $C_{2-6}$  alkenyl group, a  $C_{2-6}$  alkynyl group, a cyclohexenyl group, a 1H-pyridin-2-on-yl group, a 1-methyl-1H-pyridin-2-on-yl group, a  $C_{1-6}$  alkyl group that may have a group selected from substituent group B described below, a phenyl group that may have a

group selected from substituent group B described below, a 5 or 6-membered heteroaryl group that may have a group selected from substituent group B described below, a phenyl C<sub>1-6</sub> alkyl group that may have a group selected from substituent group B described below, or a pyridyl C<sub>1-6</sub> alkyl group that may have a group selected from substituent group B described below:

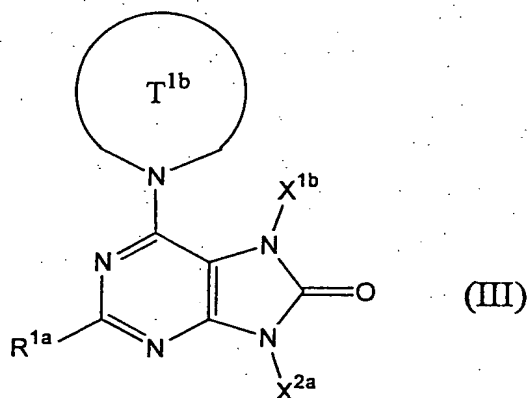
5

<Substituent group B>

substituent group B refers to a group consisting of a chlorine atom, a bromine atom, a cyano group, a C<sub>1-6</sub> alkyl group, a C<sub>2-6</sub> alkenyl group, a C<sub>2-6</sub> alkynyl group, a C<sub>3-8</sub> cycloalkyl group, a C<sub>1-6</sub> alkoxy group, a carbamoyl group, a carboxyl group, and a C<sub>1-6</sub> alkoxy carbonyl group].

10

3. A compound represented by the general formula (III), or a salt or a hydrate thereof,



[wherein,

T<sup>1b</sup> stands for a piperazin-1-yl group, a 3-amino-piperizin-1-yl group, or a

15 3-methylamino-piperizin-1-yl group;

X<sup>1b</sup> denotes a 2-pentynyl group, a 2-butylnyl group, a 3-methyl-2-butenyl group, a 2-butenyl group, or a benzyl group; and

R<sup>1a</sup> and X<sup>2a</sup> have the same meaning as X<sup>1a</sup> and X<sup>2a</sup> of claim 2 defined above].

20 4. The compound of claim 2 or 3, or a salt or a hydrate thereof, wherein R<sup>1a</sup> is a hydrogen atom, a chlorine atom, a cyano group, a methoxy group, an ethoxy group, an i-propyloxy group, a methylthio group, an allyloxy group, a 2-butylnyloxy group, a phenyloxy group, a cyanophenyloxy group, a carbamoylphenyloxy group, a phenylmethyloxy group, a (phenylmethyl)amino group, a pyridylmethyloxy group, a pyridyloxy group, an amino group, a  
25 methylamino group, a dimethylamino group, or a diethylamino group.

5. The compound of claim 2 or 3, or a salt or a hydrate thereof, wherein R<sup>1a</sup> is a hydrogen atom, a methoxy group, an ethoxy group, an i-propyloxy group, a 2-cyanophenyloxy group, or a

2-carbamoylphenyloxy group.

6. The compound of any one of claims 2 to 5, or a salt or a hydrate thereof, wherein  $X^{2a}$  is a hydrogen atom, a methyl group, an ethyl group, an n-propyl group, a 2-methylpropyl group, a group represented by the formula  $-CH_2-R^{10}$  (where  $R^{10}$  denotes a carbamoyl group, a carboxyl group, a methoxycarbonyl group, a cyano group, a cyclopropyl group, or a methoxy group), a 3-cyanopropyl group, an allyl group, a 2-propionyl group, a 2-butynyl group, a 2-methyl-2-propenyl group, a 2-cyclohexynyl group, a chloropyridyl group, a methoxypyridyl group, a methoxypyrimidyl group, a pyridyl group, a furyl group, a thienyl group, a pyridylmethyl group, a 1H-pyridin-2-on-5-yl group, a 1-methyl-1H-pyridin-2-on-5-yl group, a phenyl group that may have a group selected from substituent group Y described below, a benzyl group that may have a group selected from substituent group Y described below, or a phenethyl group that may have a group selected from substituent group Y described below: substituent group Y is a group consisting of: a chlorine atom, a bromine atom, a methoxy group, a cyano group, a vinyl group, and a methyl group.
7. The compound of any one of claims 2 to 5, a salt thereof, or a hydrate thereof, wherein  $X^{2a}$  is a methyl group, n-propyl group, allyl group, 2-propynyl group, 2-butynyl group, cyclopropylmethyl group, phenyl group, 3-pyridyl group, 3-furyl group, 3-thienyl group, 2-methoxy-5-pyrimidinyl group, 2-methoxy-5-pyridyl group, 2-chloro-4-pyridyl group, or 1H-pyridin-2-on-5-yl group.
8. A pharmaceutical comprising the compound of claim 1, a salt thereof, or a hydrate thereof.
9. A dipeptidyl peptidase IV inhibitor comprising the compound of claim 1, a salt thereof, or a hydrate thereof.
10. A pharmaceutical composition comprising the compound of claim 1, a salt thereof, or a hydrate thereof, and an adjuvant for formulation.
11. A preventive or therapeutic agent for diabetes, obesity, hyperlipidemia, AIDS, osteoporosis, gastrointestinal disorder, angiogenesis, infertility, inflammatory disease, multiple sclerosis, allergic disease, or cancer, or an immunoregulatory agent, hormone regulatory agent, or antirheumatic agent, which comprises the compound of claim 1, a salt thereof, or a hydrate thereof.

12. A preventive or therapeutic agent for diabetes, comprising the compound of claim 1, a salt thereof, or a hydrate thereof.

13. A method for treatment or prevention of a disease for which dipeptidyl peptidase IV inhibition is effective, wherein the method comprises the step of administering a patient with a pharmaceutically effective dose of the compound of claim 1, a salt thereof, or a hydrate thereof.

14. The method of treatment or prevention of claim 13, wherein the disease for which dipeptidyl peptidase IV inhibition is effective is diabetes.

15. The use of the compound of claim 1, a salt thereof, or a hydrate thereof for producing a pharmaceutical.

16. The use of claim 15, wherein the pharmaceutical is a therapeutic agent or a preventive agent for a disease for which dipeptidyl peptidase IV inhibition is effective.

17. The use of claim 15, wherein the pharmaceutical is a therapeutic agent or a preventive agent for diabetes.